

# MARICOPA ASSOCIATION OF GOVERNMENTS PARKING COST STUDY

## FINAL REPORT

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## INTRODUCTION

The Maricopa Association of Governments (MAG) is the designated agency for transportation planning in the metropolitan Phoenix area. As part of their charge, they have created and maintain a transportation planning model which is used for all modes of planning, vehicles and transit.

Two parameters used within the model are hourly and daily parking costs. These costs are used to determine the percent of home-based-work trips that travel by transit, one person auto and two, three or four-or-more person carpools. The last study of parking costs was conducted by MAG in 1984. This study concluded that average daily parking costs ranged from \$.07 to \$.80 for various traffic analysis zones (TAZs) within the metro Phoenix area.

The 1984 study was brief in nature and two assumptions were made. First, it assumed that all employees drive to work and second, it assumed that all available parking spaces for daily parking are utilized. In other words, it assumed that there was a one-to-one correlation between parking spaces and work trips and that average cost per parking space in the TAZ was equivalent to average cost per work trip in the TAZ.

These two assumptions may not be correct. Rarely are parking spaces fully utilized with a parking complex. The number of parking spaces associated with the work trip may be a small percentage of the total number of spaces. Also, not all trips to the work place are single occupancy auto trips.

In an effort to further understand the nature of parking and parking costs, this study was undertaken to collect parking data and report a more-refined parking cost value. Average out-of-pocket parking costs were developed by post-card survey. At 10 parking structures throughout the region, post-cards were distributed inquiring the driver about trip type and out-of-pocket expenses. These results were used to extrapolate parking costs at all Traffic Analysis Zones where paid parking structures were located.

After developing average parking costs per zone, statistical analyses were performed to determine what factors might influence parking costs so that a model of that relationship might be developed. An additional model was developed to predict which zones might have paid parking.

## MAG MODEL DESCRIPTION

The MAG transportation planning model uses socioeconomic data to predict traffic to and from traffic analysis zones (TAZs). The model uses the standard four-step procedure; trip generation, trip distribution, mode split and assignment. Since travel characteristics vary by type of trip, the model assumes different types of trips within the region. For example, people may be willing to drive for a long time to go to work, but rarely do they drive so long to go shopping.

The model encompasses seven trip types as follows:

- Home based work
- Home based school (elementary and high school)
- Home based school (post high school)
- Home based shopping
- Home based other
- Non-home based work
- Non-home based other

For this study, only the home-based work (HBW) trip is considered for long term parking costs. It is assumed, with some degree of confidence, that the other trip types do not pay for long-term parking. The model only uses long term parking costs in the HBW mode choice.

In order to predict HBW trips within the region, two steps are necessary. The first is a prediction of the number of employees that exist in every traffic analysis zone. This estimate is performed by MAG on a regular basis. The estimate not only predicts the number of employees in every zone, but also subdivides them into the employment type as follows:

- Retail employees
- Public employees
- Office employees
- Industrial employees
- Other employees

The second step is to calculate person trips based upon these data. While the model subdivides employment into the categories listed above, it sums them up for the calculation of total work trips. The equation is as follows:

$$\text{HBW trips} = 1.597 * \{\text{retail} + \text{public} + \text{office} + \text{industrial} + \text{other}\}$$

For most trip purposes, the MAG model is a production constrained model, i.e., it first calculates total trips based upon the number of households in the zone and keeps this number constant. These trips are then distributed to other zones based upon attractions. However, the HBW trip is an attraction-constrained model

where the reverse is true. It calculates the trips based upon total employment and keeps this number constant. These trips are then distributed to other zones based upon households.

## THEORETICAL CALCULATION OF PARKING COST

Since the MAG model uses daily parking cost per vehicle trip, it is necessary to calculate an average daily cost per HBW vehicle trip per TAZ,  $CE_{HBW,1}$ .

To estimate  $CE_{HBW,1}$ , it is necessary to estimate the cost associated with HBW trips within each TAZ. To perform this step, an inventory of all office parking associated with each TAZ that has known paid parking was conducted. The inventory counted number of spaces and posted rate. This inventory determined office parking by a stratification of parking type. This stratification was performed because it is known that some types of spaces are more expensive than others. For example, assigned covered parking spaces demand a higher rate than unassigned rooftop or surface parking spaces. The stratification used for this study is as follows:

- Unassigned Surface (US)
- Assigned Covered (AS)
- Unassigned Covered (UN)
- Unassigned rooftop (RF)
- Visitor (VS)

For each stratification, the following information was collected:

- Building name
- Type of space
- No. of spaces
- Posted monthly rate

This constitutes the universe database.

The next step is to factor and weight the universe parking database to estimate  $CE_{HBW,1}$  for each of these categories. It is not possible to sample each building and type of space for the actual out of pocket cost, so it will be estimated as a fraction of the posted rate.

$$COP_{ij} = CP_{ij} \times F_{ij}$$

Where:

- |              |   |
|--------------|---|
| $COP_{ij}$ = | Out-of-pocket cost for each parking space associated with space type (i) and parking garage (j) |
| $CP_{ij}$ =  | Posted cost for each parking space associated with space type (i) and parking garage (j)        |
| $F_{ij}$ =   | Reduction factor due to employee incentives, leasing incentives, etc.                           |



This was estimated from a postcard survey of parking spaces. The postcard asked for the employee out-of-pocket expense. The average of these expenses for all postcards returned within this space type divided by the posted rate for this space type gives an estimate of an actual reduction in parking cost realized by the driver.

The remaining step is to estimate HBW trips by stratification of parking type. This is calculated from the following equation:

$$T_{ij} = N_{ij} \times PWT_{ij} \times OS_{ij} \times PT_{ij} \quad (2)$$

Where:

$T_{ij}$ =	Work person trips associated with each space type (i) and parking garage (j).
$N_{ij}$ =	The number of parking spaces associated with each space type (i) and garage (j). This is known for the universe.
$PWT_{ij}$ =	Percent of parked vehicles that are HBW trips. The postcard asked if the trip was a HBW trip or not. The total number that said they were HBW trips divided by the total number of respondents gives this factor.
$OS_{ij}$ =	Occupancy rate of the space type. This is the actual measured occupancy of the spaces at the time of the distribution of the postcards (10:00 am to noon). It is assumed that this provides a reasonable estimate of work trips to the parking facility.
$PT_{ij}$	Percent of vehicles that have HBW trip destinations within the TAZ. This was determined from the postcard survey. Respondents were required to write the address of the building in which they worked. This factor is the percentage of total respondents that work within the TAZ in question.

Using these equations, estimates of parking cost for HBW vehicle trips can be estimated as follows:

$$CE_{HBW,t} = \frac{\sum_{i=1}^5 \sum_{j=1}^n T_{ij} \times COP_{ij}}{E_t \times D_t}$$

Where:

i = Space type = 1 to 5

t = TAZ t

j = 1 to n garages or lots with HBW trips to TAZ<sub>t</sub>.

CE<sub>HBW,i</sub> = Average daily cost per HBW vehicle trip per TAZ

E<sub>t</sub> = The total employment in the zone. These data are from MAG socioeconomic database.

D<sub>t</sub> = Percent of employees driving vehicles on an average weekday, calculated as:

$$D_t = \frac{2}{1.597} * \left[ \% \text{ drive alone} + \frac{\% \text{ carpool}}{2.3} \right]$$

These were estimated from the MAG trip reduction program data.

## DATA COLLECTION

In a preliminary data collection effort, postcards were distributed to the parking garage located at 3300 North Central Avenue on Wednesday, February 24, 1994. An example of the post-card is provided in Figure 1. After a preliminary statistical analysis, it was determined that the postcard was providing meaningful data. Therefore, an additional 10 sites were chosen and postcards were distributed. A listing of the sites and the number of post-cards distributed is given in Appendix A.

The overall survey response rate was 21% (321 of the 1,495 postcards distributed were returned), although the response rate for individual parking categories ranged from 0 to 33 percent. Average parking costs calculated from the survey responses were substantially below the posted rate schedule.

One unanticipated problem brought out by the test was the interchange-ability of visitor and unassigned spaces. Some 'visitor' postcards were actually filled in by employees, indicating that employees are parking in spaces set aside for visitors. This indicated that visitors can park in unmarked (i.e., unassigned) spaces.

Table 1 shows the results of the returned postcards by TAZ. It should be noted that Table 1 does not include a response of Visitors.

Table 2 shows an inventory of the number of spaces by space type by zone. Table 2 only includes those spaces where space type was obtainable.

Table 3 shows parking spaces at those facilities where postcards were not distributed, but where parking space costs could be obtained from the building owner.

Table 4 shows the posted parking costs by TAZ. These were obtained from actual conversations with parking lot owners.

Appendix B contains the response from the postcard survey and Appendix C shows the total number of parking spaces by TAZ and building.

## QUESTIONNAIRE

This questionnaire is part of a research project designed to study parking costs. Your response will help the Maricopa Association of Governments Transportation Planning Office improve transportation in the Valley. **Please Respond!**

Are you parking in this garage as a visitor or do you work in a nearby building? (Please check one)

Visitor\_\_\_\_ Worker\_\_\_\_

How much money do you personally pay (out-of-pocket) to park in this facility?

Visitor: How much did you pay? \$\_\_\_\_  
How long did you stay? \_\_\_\_

Worker: \$\_\_\_\_ per month/per day (circle one)

What is the name and/or address of the building in which you worked or visited?

Name\_\_\_\_\_

Address\_\_\_\_\_

Figure 1. Survey Questionnaire

Table 1. Results of Returned Postcards

Location	TAZ	Facility ID	Basic Type	Number Distributed	Number Returned	Percent Returned	Average Monthly Cost
3030 N Central Ave	553	3	Assigned	19	7	37	15.71
3030 N Central Ave	553	3	Unassigned	68	14	21	5.46
AT&T Bldg.-2800 N Central Ave	619	5	Assigned	55	13	24	16.08
AT&T Bldg.-2800 N Central Ave	619	5	Roof, Unassigned	59	9	15	10.11
AT&T Bldg.-2800 N Central Ave	619	5	Unassigned	101	23	23	16.05
Auto Ramp-21 W. Van Buren St.	754	9	Covered	3	1	33	20.00
Auto Ramp-21 W. Van Buren St.	754	9	Roof, Unassigned	4	1	25	0.00
Auto Ramp-21 W. Van Buren St.	754	9	Unassigned	78	13	17	29.98
Court 1 & 11 - 4722 & 4724 N. 24 <sup>th</sup> St	500	7	Assigned	43	7	16	1000
Court 1 & 11 - 4722 & 4724 N. 24 <sup>th</sup> St	500	7	Unassigned	115	37	32	0.95
Crown Central - 3550 N Central Ave	552	7	Assigned	27	6	22	9.33
Crown Central - 3550 N Central Ave	552	7	Roof, Unassigned	29	4	14	7.50
Crown Central - 3550 N Central Ave	552	7	Unassigned	64	4	6	11.25
Financial Center-3443 N. Central Ave	554	16	Assigned	40	12	30	16.08
Financial Center-3443 N. Central Ave	554	16	Unassigned	96	13	14	2.88
Phelps Dodge Bldg-2600 N Central Ave	619	.3	Assigned	47	9	19	12.22
Phelps Dodge Bldg-2600 N Central Ave	619	3	Roof, Unassigned	8	2	11	0.00
Phelps Dodge Bldg-2600 N Central Ave	619	3	Unassigned	69	30	43	34.04
Phoenix Plaza-2901 N Central Ave	555	1	Assigned	41	12	29	23.33
Phoenix Plaza-2901 N Central Ave	555	1	Roof, Unassigned	6	3	50	18.00
Phoenix Plaza-2901 N Central Ave	555	1	Unassigned	67	20	30	810
Renaissance Square-40 N Central Ave	754	7	Assigned	22	10	45	40.50
Renaissance Square-40 N Central Ave	754	7	Unassigned	22	11	50	44.75
U-Haul Towers-2727 N Central Ave	621	3	Covered	124	26	21	0.00
U-Haul Towers-2727 N Central Ave	621	3	Roof, Unassigned	23	3	13	0.00

**Table 2. Inventory of Parking Spaces by TAZ**

TAZ	TAZ Total Spaces	Surface Visitor	Surface Covered	Surface Other Assigned	Surface Unassigned	Structure Visitor	Structure Assigned	Structure Unassigned	Structure Rooftop
460.00	2,835.00	27.00	140.00	5.00	146.00	186.00	2331.00	-	-
462.00	2,445.00	76.00	252.00	14.00	427.00	43.00	306.00	444.00	86.00
495.00	583.00	13.00	18.00	1.00	11.00	-	135.00	405.00	-
499.00	1,734.00	70.00	218.00	40.00	652.00	-	50.00	222.00	-
500.00	3,338.00	36.00	69.00	49.00	122.00	329.00	535.00	1,616.00	-
502.00	3,660.00	541.00	347.00	43.00	471.00	285.00	796.00	1,177.00	-
552.00	4,122.00	503.00	228.00	104.00	640.00	-	458.00	639.00	384.00
553.00	2,869.00	-	-	-	43.00	264.00	747.00	1,212.00	603.00
554.00	3,444.00	31.00	138.00	268.00	703.00	5.00	802.00	1,493.00	-
555.00	8,644.00	207.00	180.00	30.00	1,148.00	365.00	1,528.00	4,096.00	653.00
619.00	3,041.00	-	60.00	1.00	146.00	202.00	607.00	1,613.00	412.00
620.00	2,742.00	439.00	102.00	93.00	990.00	25.00	75.00	1,018.00	-
621.00	1,656.00	57.00	239.00	24.00	361.00	-	697.00	191.00	87.00
689.00	2,742.00	439.00	102.00	93.00	990.00	25.00	75.00	1,018.00	-
691.00	1,890.00	2.00	42.00	71.00	778.00	-	200.00	799.00	-
692.00	2,388.00	-	19.00	220.00	651.00	141.00	74.00	947.00	336.00
751.00	1,954.00	176.00	18.00	7.00	451.00	238.00	226.00	838.00	-
754.00	5,247.00	-	32.00	-	516.00	504.00	1,032.00	1,683.00	80.00
756.00	3,543.00	-	-	2.00	1,065.00	881.00	505.00	1,090.00	-
756.00	2,430.00	-	-	-	280.00	-	-	2,000.00	150.00
<b>TOTAL</b>	<b>61,239.00</b>	<b>2,223.00</b>	<b>2,169.00</b>	<b>1,124.00</b>	<b>9,698.00</b>	<b>3,804.00</b>	<b>11,580.00</b>	<b>22,566.00</b>	<b>3,213.00</b>

**Table 3. Parking Costs of Facilities Through Conversations With Building Owners**

Location	TAZ	Facility ID	Basic Type	#Spaces	Avg. Mo. Cost
Central & One Thomas - 2828 N. Central Ave	691	1	Assigned	200	0.00
Central & One Thomas - 2828 N. Central Ave	691	1	Unassigned	99	22.00
The Arizona Republic - 460 N 2 <sup>nd</sup> St	691	10	Unassigned	700	16.00
Central & One Thomas - 2828 N. Central Ave	619	6	Assigned	72	0.00
Central & One Thomas - 2828 N. Central Ave	619	6	Unassigned	100	2.55
Arizona Center - 401 E. Filmore St	692	7	Reserved		15.00
Arizona Center - 401 E. Filmore St.	692	7	Unreserved		21.00
Arizona Center - 401 E. Filmore St.	692	7	Rooftop		15.00

**Table 4. Posted Parking Costs by TAZ**

TAZ	Surface Covered	Surface Other Assigned	Surface Unassigned	Structure Assigned	Structure Unassigned	Structure Rooftop
460.00	25.00	0.00	0.00	53.93	-	-
462.00	31.35	0.00	0.00	2.37	0.00	0.00
495.00	0.00	0.00	0.00	-	-	-
499.00	24.66	0.00	0.00	40.00	0.00	-
500.00	26.23	0.00	0.00	53.52	36.43	-
502.00	24.80	0.00	0.00	60.87	50.00	-
552.00	31.93	12.63	12.62	48.18	32.96	18.76
553.00	-	-	13.91	61.60	41.77	25.21
554.00	21.74	0.00	11.39	40.29	34.60	-
555.00	26.06	12.50	10.75	47.26	49.65	28.52
619.00	28.00	0.00	0.00	57.40	36.99	22.00
620.00	11.49	0.00	0.00	56.40	40.16	25.63
689.00	21.18	20.62	11.88	61.20	40.89	-
691.00	0.00	0.00	10.24	0.00	16.74	-
692.00	25.26	40.00	0.00	70.00	55.00	35.00
751.00	0.00	0.00	17.75	0.00	25.00	-
754.00	-	-	23.72	61.60	52.66	37.50
756.00	-	35.00	26.29	70.00	60.00	-
759.00	-	-	25.00	-	35.00	-



## PARKING COST CALCULATION

After the data collection occurred at the 11 buildings within 9 TAZ's, statistical analyses were performed to estimate the factors.

$F_{ij}$  A statistical analysis was conducted, and the following values of  $F_{ij}$  were obtained. The SAS analysis is located in Appendix D.

Assigned	.2330
Unassigned	.3952
Rooftop	.3786
Unassigned Surface	.1989 (includes assigned roof)

$PWT_{ij}$  Percent of trips that were "work" are shown here. This came from the survey and is shown in Appendix E.

Visitor	47.6%
Assigned	97%
Unassigned	97%
Rooftop	100%
Unassigned Surface	83%
Handicapped	86%

$OS_{ij}$  The occupancy of the spaces was noted during the handing out of the cards. A statistical analysis showed that OS did not change by space type, only if the space was on or off the roof. The factors are shown here with a SAS analysis in Appendix F.

Non-roof	.6073
Roof	.1938

$PT_{ij}$  This parameter was determined from the postcard survey. In each case, the results showed that the people parking in this garage also work within their TAZ.

Visitor	1.00
Assigned	1.00
Unassigned	1.00
Rooftop	1.00
Unassigned Surface	1.00

Using these factors and the universe database, both  $T_{ij}$  and  $COP_{ij}$  were calculated for each parking garage (j) and space type (i). A SAS [program was then written to calculate average parking costs by TAZ.

The Average Daily Parking Cost by TAZ for all HBW trips is given in Table 5.

**Table 5. Average Daily Parking Cost by TAZ**

<b>TAZ</b>	<b>Daily Parking Cost</b>
460	.53
462	.04
495	.18
499	.02
500	.20
502	.42
552	.10
553	.13
554	.11
555	.36
619	.18
620	.23
689	.34
691	.05
692	.20
751	.19
754	.16
756	.21
759	.46
<b>Average of all zones:</b>	<b>.20</b>

## PREDICTION OF ZONES WITH PAID PARKING

Once an average zonal parking cost was established for each zone with paid parking, several analyses were performed to determine what (if any) relationships might exist between the cost of paid parking and variables that might already exist in the current MAG model.

A two-step approach was utilized in approaching this problem. First, a model was needed to predicted which zones might have paid parking. A second model was needed to determine what that average parking cost might be.

MAG maintains a database of land use categories within the region. This database shows the predominant land use on a parcel basis. These parcels are much smaller than the traffic analysis zones (TAZs) utilized in the model. Figures 2, 3, and 4 on the following pages show the land use categories for each parcel, and those zones with paid parking.

Visually, it was noticed that paid parking exists within those zones that have high-rise office space (yellow on Figures 2, 3 and 4). These zones also have a fair amount of neighborhood office space (blue on Figures 2, 3 and 4). MAG will not maintain office space by these classifications in the future. The only data that will be maintained is the total of these two office spaces (blue and yellow).

Several different plots were developed to establish the relationship between office space and paid parking. In other studies, it was noticed that the area type function was a useful predictor in the MAG model. However, the area type function is developed on a district basis. In this model, it was determined that the area type function is helpful if calculated for zones within a half mile of each other.

The half mile area type function is calculated as follows:

- 1) Add up all households and employment within  $\frac{1}{2}$  mile of the subject zone. (This was accomplished by calculating the zone to zone centroid distance. If this value was less than  $\frac{1}{2}$  mile, then the entire zone was considered to be within  $\frac{1}{2}$  mile).
- 2) 
$$\text{Density} = (\text{households} + 2 * \text{employment}) / \text{area}$$

It was also noticed that in order for there to be paid parking within the zone, the zone must have at least 2 acres of office employment (either neighborhood or high rise).

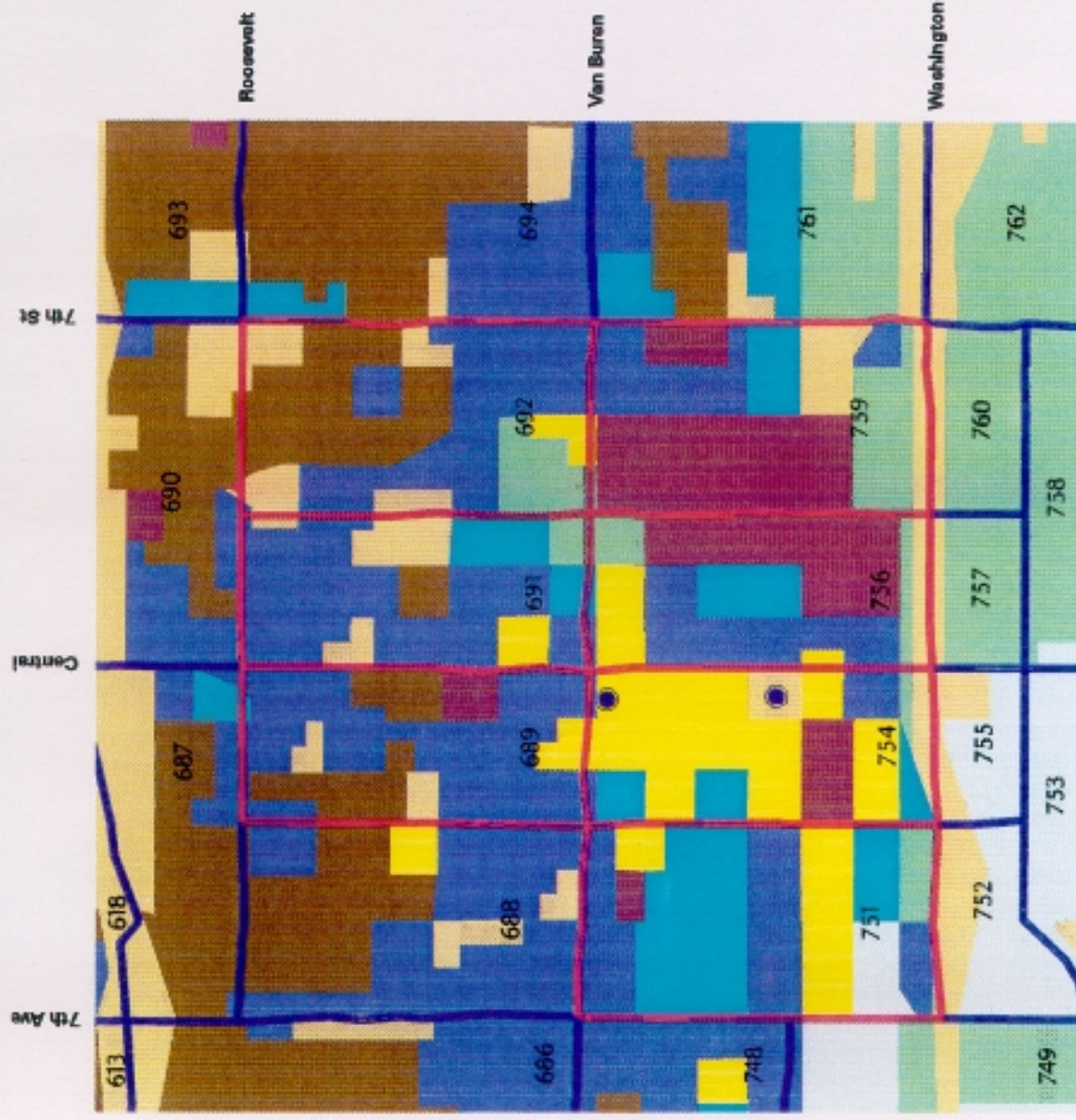
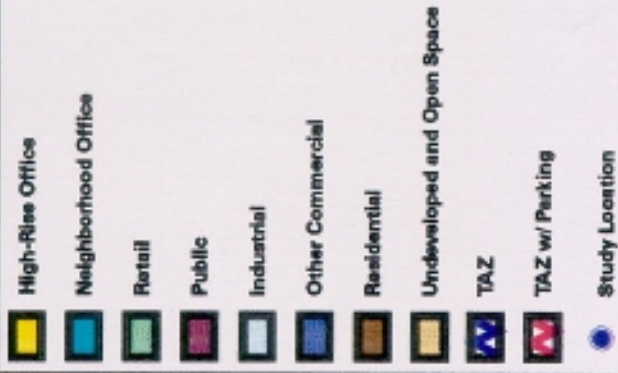


Figure 2. Land Use and Zones with Paid Parking



# MAG TRAFFIC ANALYSIS ZONES AND LAND USE

## LEGEND

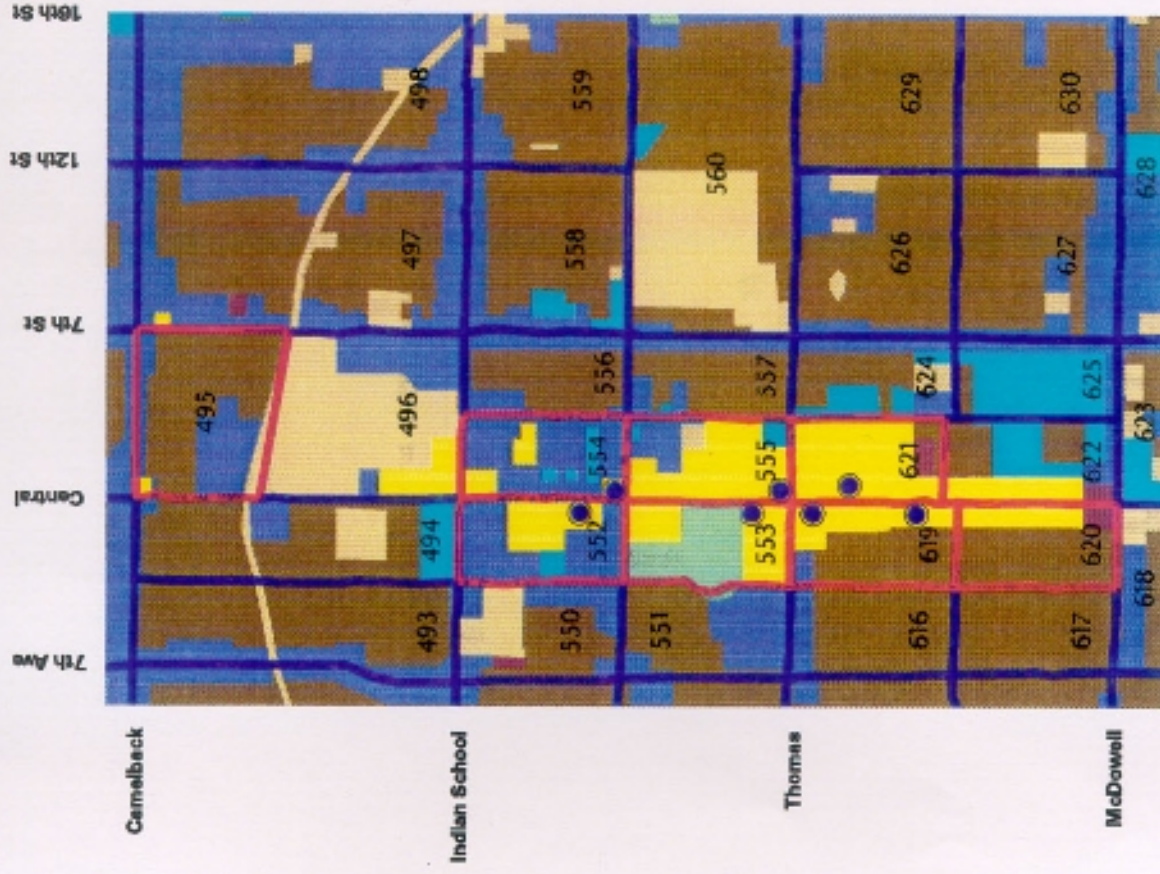


Figure 3. Land Use and Zones with Paid Parking



# MAG TRAFFIC ANALYSIS ZONES AND LAND USE

## LEGEND

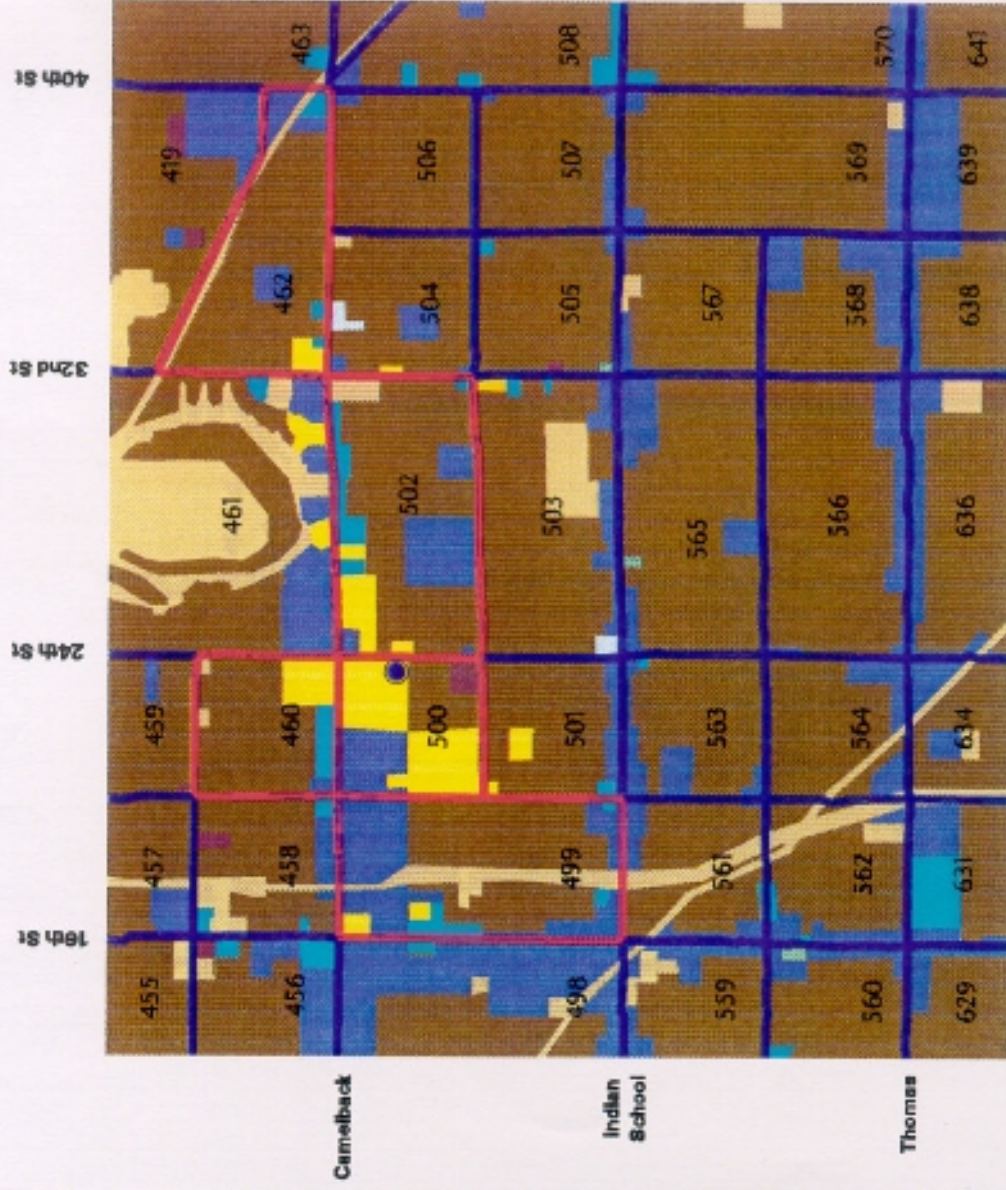
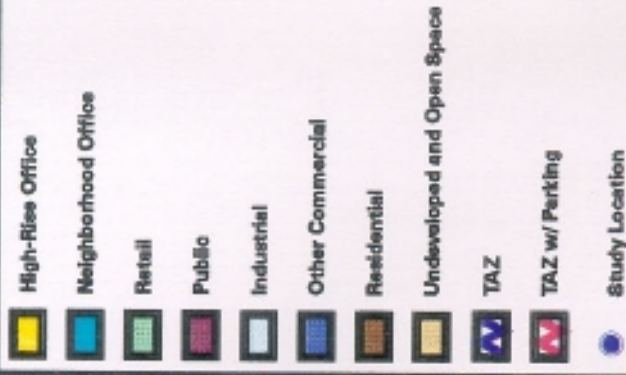


Figure 4. Land Use and Zones with Paid Parking

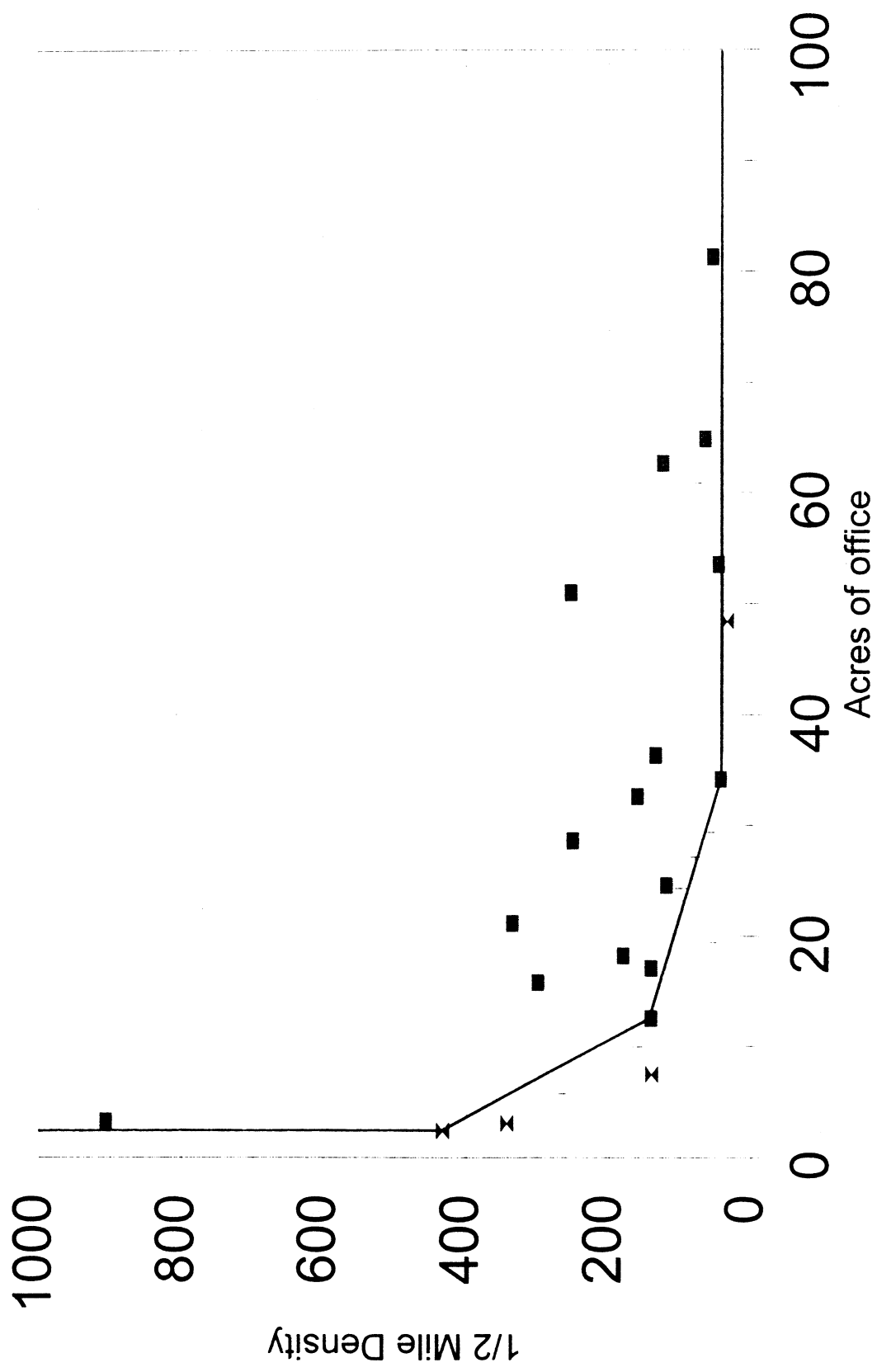
The following procedure was then developed to predict those zones with paid parking.

- 1) Select those zones with greater than 2 acres of office space.
- 2) Select those zones with at least 750 office employees.
- 3) Select those zones with a ½ mile area type density greater than 120.

Those zones that meet these three criteria are then plotted on a graph of employment density (office employees/office area) vs. acres of office, as shown in Figure 5. The solid line depicts the cutoff point between zones with paid parking and zones without paid parking. Above the line, these zones are likely to have paid parking. Below the line, they are likely to not have paid parking.

Finally, if the area type density function is over 1000, then regardless of the criteria in 1) through 3) above, the zone will most likely have paid parking. There were three zones which had an area-type density function over 1000. These were zones 555, 554, and 553. A map showing these three zones as provided in Figure 6.

Figure 5. Density vs. Acres of office





# MAG TRAFFIC ANALYSIS ZONES AND LAND USE

## LEGEND

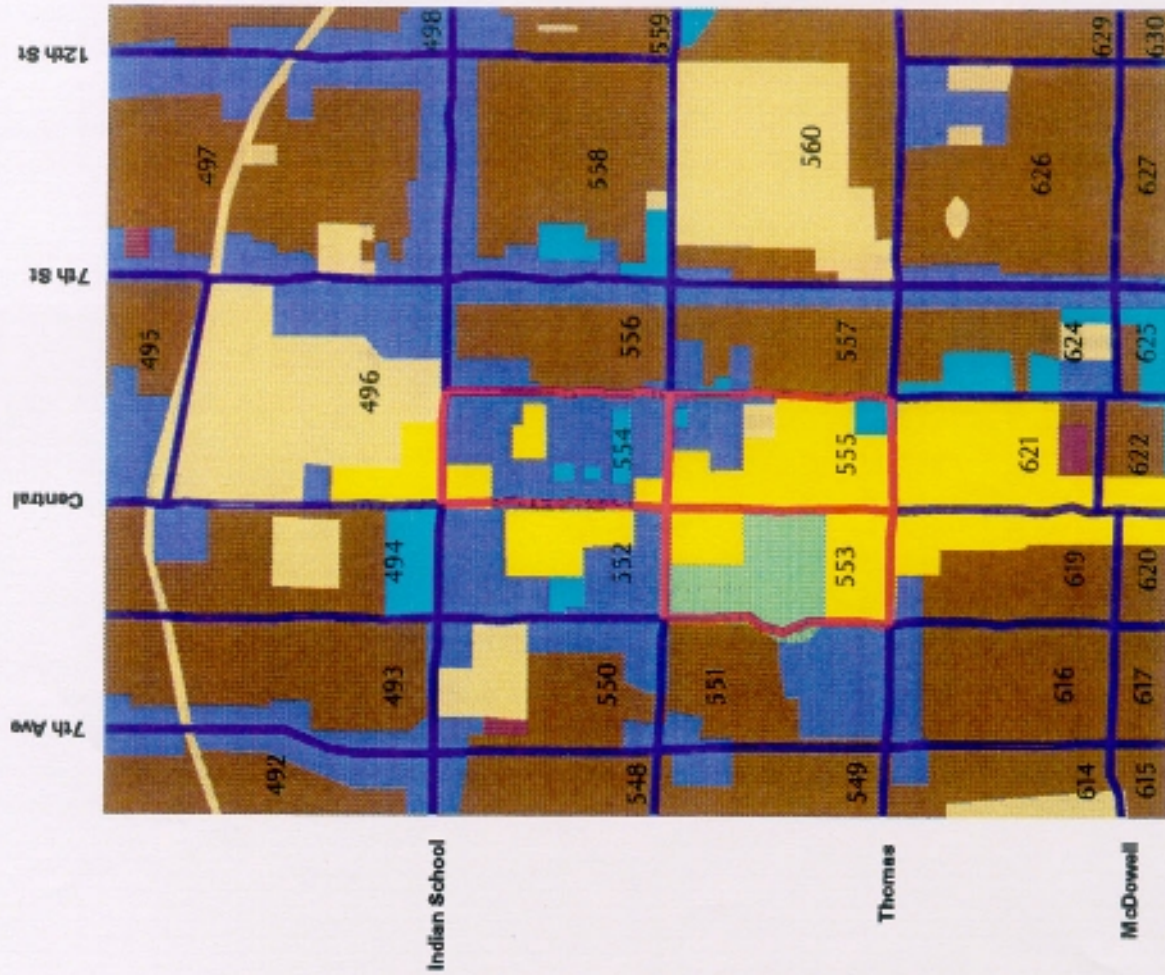


Figure 6. Zones with a 1/2 mile area type density function greater than 1000.

## ESTIMATION OF ZONAL PARKING COSTS

Once the zones with paid parking are determined, the average daily zonal parking cost needs to be estimated. The average daily zonal parking cost is the average cost per home-based-work trip as discussed previously.

A review of the parking costs that were developed for each zone was undertaken to determine if there seemed to be any logical relationships. It was noticed that zone 759 and 460 had high parking costs in comparison to the rest of the zones. There did not appear to be anything unusual about zone 460, however, zone 759 had many more parking spaces than employees. This is the zone that contains the Civic Center. By contracting the parking lot manager, it was determined that very few workers park in this structure as it is mainly used for event parking. Therefore, it was felt that this zone should be deleted from the analysis.

It was also noticed that zones 689, 754 and 751 shared parking across zone boundaries. By combining these zones into a common zone, this provides a better calculation of zonal parking costs.

Several iterations were performed investigating the relationship between zonal parking costs and variable within the zone. None of these proved to explain the variance within parking. It is known that of the five employment types, only office and public are likely to pay for parking, however, all five types are included in the mode choice model.

Since only office and public employees are likely to pay for parking, another calculation was performed to calculate average daily parking costs for public and office employees only. These are given in Table 6.

The final model estimates an average daily parking revenue for each zone based on office and public employment. This revenue estimate is divided by the number of HBW trips to produce the average daily zonal parking costs used in the mode choice model.

The model to predict zonal revenue for each office and public employee is as follows:

Daily Revenue = \$0.22 \* (Office + Public Employment)

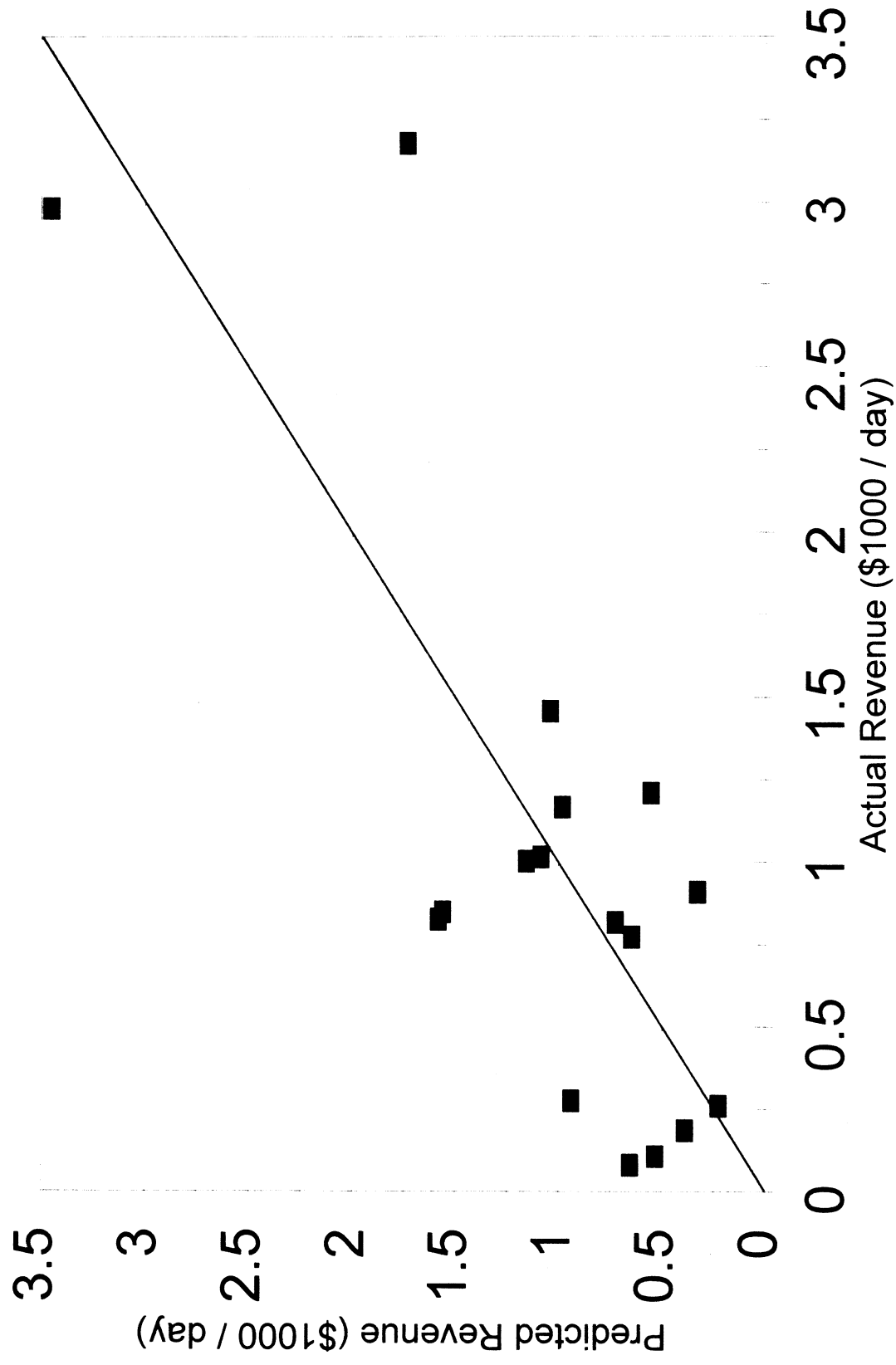
The \$.22 is the average revenue from Table 6.

To check this model, predicted zonal revenue was plotted against actual zonal revenue, and is shown in Figure 7.

**Table 6. Average Daily Zonal Parking Costs  
for Office and Public Employment**

TAZ	Average Daily Parking Costs
462	.04
502	.46
495	.24
499	.03
460	.59
500	.25
691	.10
620	.24
692	.25
619	.18
621	.06
689/754/751	.18
552	.11
756	.30
555	.39
554	.12
553	.20
<b>Average of all Zones</b>	<b>.22</b>

Figure 7. Actual vs. Predicted Revenue



**APPENDIX A**  
**POSTCARD DISTRIBUTION**

3030 North Central Parking Garage Summary:

Assigned covered Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
61	92	19

Unassigned Covered Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
201	352	68

Totals:

Number of Occupied Spaces	Total Number of Spaces	Number Cards Distributed
262	444	87

AT&T Parking Garage Summary (2800 N Central):

Assigned Structure Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
113	164	55

Unassigned Structure Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
495	664	98

Handicapped Structure Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
3	10	2

Unassigned Rooftop Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
59	161	59

Handicapped Rooftop Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
0	2	0

Visitor Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
77	79	38

Totals:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
693	1080	252

Summary for AutoRamp Garage located at 21 W. Van Buren, Phoenix

Unassigned Covered Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
138	321	59

Rooftop Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
4	80	4

Hourly Covered Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
38	52	19

Reserved Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
3	5	3

Totals:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
183	458	85



Court I & II Summary (4722 & 4747 N 24<sup>th</sup> Street):

Assigned Covered Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
124	160	35

Unassigned Covered Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
569	720	111

Covered Handicapped:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
9	21	9

Covered Visitor:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
90	127	16

Totals:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
792	1028	171

Illegally Parked Vehicles: 11

Financial Center Summary (3443 N. Central):

Assigned Covered Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
179	304	40

Unassigned Covered Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
221	324	27

Unassigned Uncovered:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
281	631	169

Totals:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
681	1259	236

Illegally parked vehicles: 5

Phelps Dodge Parking Garage Summary (2600 N Central):

Handicapped Rooftop Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
0	4	0

Unassigned Rooftop Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
36	138	18

Structure Visitor Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
28	37	19

Structure Unassigned Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
151	405	68

Structure Assigned Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
137	216	46

Structure Handicapped Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
1	16	1

Totals:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
353	816	152

Phoenix Plaza Parking Garage Summary (2901 N. Central):

Assigned Structure Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
158	327	41

Unassigned Structure Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
1422	2278	63

Visitor Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
179	180	24

Structure Handicapped Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
3	8	1

Rooftop Unassigned Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
50	388	6

Rooftop Handicapped Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
1	2	0

Totals:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
1807	3183*	135

\*Due to time constraints, we were not able to count the entire garage—we sampled and counted as much as we could between 10 AM and noon.

Renaissance Square Parking Garage Summary (40 N. Central):

Assigned Structure Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
98	159	22

Unassigned Structure Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
107	321	19

Visitor Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
112	133	20

Handicapped Structure Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
3	17	1

Totals:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
320	630	62

U-Haul Towers Parking Garage Summary:

Assigned Covered Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
440	601	122

Assigned Rooftop Spaces:

Number Occupied Spaces	Total Numbers of Spaces	Number Cards Distributed
69	109	23

Visitor Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
19	25	18

Totals:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
528	735	163

Crown Central Parking Summary:

**SURFACE LOT:**

Assigned Covered Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
58	111	29

Assigned Uncovered Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
1	18	1

Uncovered Unassigned Spaces (Visitor Included):

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
147	176	50

Uncovered Handicapped Spaces:

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
2	9	2

**Surface Totals:**

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
208	314	82

## **PARKING STRUCTURE**

### **Assigned Spaces:**

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
76	126	25

### **Unassigned Spaces:**

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
40	71	13

### **Handicapped Spaces:**

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
2	4	2

### **Rooftop Assigned Spaces:**

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
3	20	3

### **Rooftop Unassigned Spaces:**

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
1	90	1

### **Structure Totals:**

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
122	311	44



**GRAND TOTALS:**

Number Occupied Spaces	Total Number of Spaces	Number Cards Distributed
330	625	126

**APPENDIX B**  
**ACTUAL POSTCARD RESPONSES**

# LISTING OF ALL RETURNED POSTCARDS

Page 1

Tuesday, October 04, 1994

SURVEY

Card Num	Visitor/Worker	Visitor Paid	Visitor Stayed Hours	Worker Per Month
4.00	W			0.00
6.00	W			0.00
18.00	W			0.00
26.00	W			0.00
28.00	W			0.00
30.00	W			0.00
48.00	W			0.00
55.00	W			0.00
58.00	W			0.00
62.00	W			0.00
70.00	W			0.00
71.00	W			0.00
75.00	W			0.00
86.00	W			0.00
87.00	W			0.00
88.00	W			0.00
90.00	W			0.00
101.00	W			0.00
106.00	W			0.00
108.00	W			0.00
112.00	W			0.00
116.00	W			0.00
120.00	W			0.00
123.00	W			0.00
135.00	V	\$0.00	0.20	
137.00	W			0.00
144.00	V	\$0.00	0.50	
152.00	W			0.00
153.00	W			0.00
159.00	W			0.00
162.00	W			0.00
167.00	W			0.00
175.00	V	\$5.00		
183.00	W			55.00
188.00	W			0.00
189.00	W			45.00
191.00	W			0.00
194.00	W			25.00
195.00	W			60.00
200.00	W			0.00
204.00	W			50.75
205.00	W			29.00
207.00	W			45.00
210.00	W			30.00
217.00	V	\$0.00	9.00	
225.00	W			20.00
226.00	W			0.00
242.00	W			50.00
248.00	V	\$5.00	4.00	
253.00	V	\$2.00	1.50	
258.00	W			15.00
259.00	W			0.00
263.00	W			25.00
268.00	W			22.00
269.00	W			0.00
270.00	W			22.00
275.00	W			0.00
284.00	W			0.00

# LISTING OF ALL RETURNED POSTCARDS

Tuesday, October 4, 1994

## SURVEY

Card Num	Visitor/Worker	Visitor Paid	Visitor Stayed Hours	Worker Per Month
285.00	W			0.00
286.00	W			0.00
293.00	W			0.00
295.00	W			0.00
301.00	W			10.00
304.00	W			10.00
311.00	W			0.00
316.00	W			12.50
325.00	W			0.00
328.00	W			20.00
332.00	W			0.00
333.00	W			50.00
336.00	W			0.00
377.00	W			0.00
378.00	W			30.00
380.00	W			0.00
382.00	W			0.00
390.00	W			0.00
409.00	W			0.00
425.00	W			0.00
430.00	W			0.00
432.00	W			0.00
433.00	W			25.00
438.00	W			31.00
447.00	W			30.00
448.00	W			0.00
449.00	W			15.00
468.00	W			17.50
484.00	V	\$0.00	5.00	
518.00	W			0.00
519.00	W			0.00
527.00	W			0.00
533.00	W			0.00
535.00	W			0.00
542.00	W			50.00
545.00	W			50.00
546.00	W			0.00
547.00	W			0.00
549.00	W			30.00
550.00	W			49.95
554.00	W			0.00
557.00	W			13.00
564.00	W			0.00
585.00	W			0.00
572.00	W			20.00
574.00	W			0.00
576.00	W			0.00
581.00	W			0.00
588.00	W			0.00
589.00	W			0.00
591.00	W			0.00
595.00	W			0.00
597.00	W			0.00
599.00	W			0.00
602.00	W			0.00
605.00	W			0.00
610.00	W			0.00
611.00	W			0.00
615.00	W			0.00

# LISTING OF ALL RETURNED POSTCARDS

Page 3

Tuesday, October 04, 1994

## SURVEY

Card Num	Visitor/Worker	Visitor Paid	Visitor Staval Hours	Worker Per Month
617.00	W			0.00
624.00	V	\$0.00	0.03	
629.00	V	\$0.00	1.00	
630.00	V	\$0.00	2.00	
635.00	W			20.00
639.00	W			20.00
641.00	W			20.00
645.00	W			0.00
649.00	W			0.00
651.00	W			0.00
654.00	W			0.00
656.00	W			0.00
657.00	W			0.00
662.00	W			0.00
663.00	W			0.00
668.00	W			0.00
673.00	W			5.00
676.00	W			0.00
677.00	W			0.00
678.00	W			0.00
680.00	W			0.00
682.00	W			0.00
685.00	W			0.00
689.00	W			0.00
692.00	W			0.00
694.00	W			0.00
702.00	W			0.00
706.00	W			0.00
707.00	W			0.00
710.00	W			0.00
721.00	W			5.00
726.00	W			0.00
727.00	W			0.00
730.00	W			0.00
734.00	W			15.00
736.00	W			0.00
756.00	W			0.00
759.00	W			0.00
760.00	W			0.00
763.00	W			0.00
766.00	W			15.00
768.00	W			0.00
770.00	W			0.00
777.00	W			0.00
796.00	W			40.00
798.00	W			40.00
799.00	W			18.00
803.00	W			40.00
805.00	W			40.00
809.00	W			40.00
811.00	W			0.00
813.00	W			40.00
815.00	W			40.00
816.00	W			40.00
819.00	W			40.00
821.00	W			40.00
822.00	W			0.00
823.00	W			0.00
827.00	W			0.00

# LISTING OF ALL RETURNED POSTCARDS

Page 4

Tuesday, October 04, 1994

## SURVEY

Card Num	Visitor/Worker	Visitor Paid	Visitor Staval Hours	Worker Per Month
829.00	W			0.00
831.00	W			40.00
832.00	W			40.00
835.00	W			65.00
836.00	W			40.00
837.00	W			40.00
838.00	W			40.00
840.00	W			40.00
842.00	W			40.00
843.00	W			40.00
844.00	W			0.00
845.00	W			40.00
849.00	W			0.00
861.00	W			40.00
870.00	W			0.00
873.00	W			40.00
875.00	W			40.00
876.00	W			18.00
884.00	V	\$0.00	3.00	
890.00	W			60.00
892.00	W			0.00
893.00	V	\$0.00		
895.00	W			40.00
912.00	W			0.00
915.00	W			0.00
920.00	W			00
925.00	V	\$0.00	20.00	
930.00	W			0.00
941.00	W			100.00
943.00	V	\$0.00	4.50	
949.00	W			25.00
950.00	W			0.00
957.00	W			0.00
963.00	W			0.00
964.00	W			0.00
965.00	W			45.00
967.00	W			0.00
969.00	W			0.00
970.00	W			12.00
974.00	W			70.00
979.00	W			70.00
983.00	W			70.00
987.00	W			0.00
988.00	W			70.00
990.00	W			0.00
991.00	W			0.00
999.00	W			55.00
1,000.00	W			4500
1,001.00	W			0.00
1,006.00	W			30.00
1,009.00	W			25.00
1,010.00	W			0.00
1,015.00	W			40.00
1,017.00	W			0.00
1,018.00	W			0.00
1,021.00	W			0.00
1,023.00	W			0.00
1,025.00	W			0.00
1,030.00	W			58.19

# LISTING OF ALL RETURNED POSTCARDS

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Tuesday, October 04, 1994

## SURVEY

Card Num	Visitor/Worker	Visitor Paid	Visitor Stayed Hours	Worker Per Month
1,032.00	W			55.00
1,037.00	W			20.00
1,039.00	W			55.00
1,040.00	W			55.00
1,042.00	W			60.00
1,043.00	W			55.00
1,050.00	W			0.00
1,051.00	W			0.00
1,055.00	W			20.00
1,056.00	W			20.00
1,058.00	W			60.00
1,061.00	W			40.00
1,068.00	W			58.00
1,075.00	V	\$0.00	10.00	
1,078.00	W			58.00
1,083.00	W			0.00
1,084.00	W			55.00
1,085.00	W			58.00
1,086.00	W			55.00
1,089.00	W			60.00
1,090.00	W			55.00
1,095.00	W			10.00
1,099.00	W			0.00
1,100.00	W			19.00
1,102.00	W			35.00
1,105.00	W			25.00
1,107.00	W			25.00
1,109.00	W			30.00
1,117.00	W			5.00
1,129.00	W			22.00
1,137.00	W			0.00
1,138.00	W			0.00
1,143.00	W			15.00
1,159.00	W			22.00
1,161.00	W			0.00
1,177.00	W			22.00
1,189.00	W			0.00
1,191.00	W			18.00
1,199.00	W			25.00
1,200.00	W			0.00
1,202.00	V	\$0.00	7.00	
1,203.00	W			25.00
1,212.00	W			0.00
1,221.00	W			25.00
1,222.00	W			
1,225.00	W			0.00
1,227.00	W			40.00
1,230.00	W			30.00
1,232.00	W			30.00
1,233.00	W			18.00
1,235.00	W			40.00
1,245.00	W			20.00
1,251.00	W			25.00
1,254.00	W			10.00
1,256.00	W			18.00
1,266.00	W			0.00
1,268.00	W			0.00
1,269.00	W			0.00
1,270.00	W			0.00

# LISTING OF ALL RETURNED POSTCARDS

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Tuesday, October 04, 1994

## SURVEY

Card Num	Visitor/Worker	Visitor Paid	Visitor Stayed Hours	Worker Per Month
1,280.00	W			0.00
1,286.00	V	\$0.00	8.00	
1,300.00	V	\$0.00	1.50	
1,303.00	V	\$0.00	2.00	
1,304.00	V	\$0.00	8.00	
1,314.00	V	\$0.00	8.00	
1,322.00	W			30.00
1,323.00	W			25.00
1,330.00	W			48.00
1,332.00	W			30.00
1,341.00	W			0.00
1,345.00	W			0.00
1,348.00	W			0.00
1,351.00	W			0.00
1,359.00	W			40.00
1,361.00	W			36.00
1,362.00	W			0.00
1,366.00	W			45.00
1,368.00	W			0.00
1,370.00	W			0.00



## **APPENDIX C**

### **TOTAL SPACES BY TAZ AND BUILDING**

# LISTING OF ALL FEE PARKING FACILITIES

Tuesday, October 04, 1994

TAZ	Facility ID	Location	Total Spaces	Free Parking
460.00	5.00	2390 East Camelback Biltmore Financial Center	2,300.00	Y
462.00	1.00	3200 East Camelback Biltmore Financial Center	755.00	Y
495.00	1.00	One Camelback (Thunderbird Bank)	540.00	Y
499.00	7.00	1661 East Camelback (Camelback Arboleda)	649.00	Y
500.00	2.00	2201-2231 East Camelback (Anchor Centre)	1,076.00	Y
502.00	4.00	2425 East Camelback (Camelback Esplanade)	2,215.00	Y
552.00	1.00	First Avenue South of Indian School	86.00	Y
552.00	2.00	North of 3800 North Central	178.00	Y
552.00	3.00	Phoenix City Square	1,166.00	Y
552.00	4.00	3636 North Central (One Columbus Plaza)	613.00	Y
552.00	7.00	3550 North Central (Crown Central)	951.00	Y
552.00	8.00	NEC of Third Avenue & Indianola	320.00	Y
552.00	9.00	56 West Weldon	570.00	Y
553.00	1.00	3300 North Central (Norwest)	1,102.00	Y
553.00	2.00	3200 North Central (Great American)	1,162.00	Y
553.00	3.00	3030 North Central	605.00	Y
554.00	16.00	3443 North Central (Financial Center)	1,304.00	Y
554.00	19.00	4041 North Central	1,200.00	Y
555.00	1.00	2901 North Central (Phoenix Plaza)	3,850.00	Y
555.00	2.00	3003 & 3033 North Central (Phoenix Corporate Center)	1,364.00	Y
555.00	3.00	3101 North Central (National Bank Plaza)	500.00	Y
555.00	4.00	3225 North Central (Century Plaza)	626.00	Y
555.0	5.00	North of 3225 North Central	200.00	Y
555.00	11.00	210 East Earl	600.00	Y
555.00	14.00	North of 2907 North Second Street	40.00	Y
619.00	3.00	2600 North Central (Phelps Dodge)	810.00	Y
619.00	4.00	2700 North Central (Xerox)	592.00	Y
619.00	5.00	2800 North Central (AT&T)	1,061.00	Y
619.00	6.00	2828 North Central (Central One & Thomas Building)	261.00	Y
620.00	1.00	1850 North Central (Dial Corporate Center)	1,274.00	Y
620.00	2.00	2020 North Central (Central Park Square)	810.00	Y
621.00	3.00	2727 North Central (Uhaul)	669.00	Y
621.00	9.00	East of 55 East Thomas	100.00	Y
689.00	1.00	Northwest corner of Van Buren & Central	36.00	Y
689.00	2.00	Central between Fillmore and Van Buren	100.00	Y
689.00	3.00	West side of Central between Fillmore and Van Buren	204.00	Y
689.00	7.00	West side of First Avenue, North of Van Buren	53.00	Y
689.00	8.00	West side of First Avenue, North of Van Buren	48.00	Y
689.00	9.00	308 North First Avenue	172.00	Y
689.00	10.00	311 North First Avenue	124.00	Y
689.00	12.00	North of 364 North First Avenue	88.00	Y

LISTING OF ALL FEE PARKING FACILITIES

Tuesday, October 04, 1994

TAZ	Facility ID	Location	Total Spaces	Fee Parking
689.00	20.00	West side of Second Avenue, North of Van Buren	70.00	Y
689.00	21.00	East side of Second Avenue, North of Van Buren	82.00	Y
689.00	22.00	Second Avenue North of Van Buren (1 <sup>st</sup> Interstate Bank Building)	803.00	Y
689.00	26.00	Northeast corner of Van Buren and Third Avenue	39.00	Y
689.00	27.00	Across from 315 North Third Avenue	44.00	Y
689.00	28.00	Across from 362 North Third Avenue	60.00	Y
689.00	29.00	Across from 362 North Third Avenue	80.00	Y
689.00	33.00	First Avenue North of Van Buren	315.00	Y
691.00	1.00	411 North Central (APS)	299.00	Y
691.00	3.00	Northwest Corner of First Street & Van Buren (Bank One)	130.00	Y
691.00	4.00	First Street & Fillmore (APS)	250.00	Y
691.00	10.00	460 North Second Street (AZ Republic)	700.00	Y
692.00	5.00	455 North Fifth Street (Phoenix Municipal Court Center)	840.00	Y
692.00	7.00	401 East Fillmore (Arizona Center)	1,498.00	Y
751.00	1.00	Third Avenue & Van Buren	52.00	Y
751.00	2.00	305 West Washington (City of Phoenix Garage)	1,302.00	Y
751.00	3.00	Northeast Corner of Fourth Avenue & Monroe	73.00	Y
751.00	4.00	Fourth Avenue & Monroe	50.00	Y
751.00	5.00	Fourth Avenue & Adams	254.00	Y
751.00	8.00	North side of Monroe between Fifth and Sixth Avenues	86.00	Y
751.00	9.00	Third Avenue & Adams	98.00	Y
754.00	1.00	1 West Jackson	193.00	Y
754.00	3.00	132 South Central (Luhrs Office Center)	435.00	Y
754.00	4.00	Washington between Central & First Avenue (Patriot's Square Park)	1,520.00	Y
754.00	5.00	100 West Washington (1 <sup>st</sup> Interstate Bank Plaza)	580.00	Y
754.00	6.00	First Avenue & Monroe (Bank of America Building)	1,000.00	Y
754.00	7.00	First Avenue between Washington & Adams, East Side (Renaissance Square)	400.00	Y
754.00	9.00	21 West Van Buren (Auto Ramp)	460.00	Y
754.00	10.00	Second Avenue South of Monroe	504.00	Y
754.00	11.00	First Avenue & Adams-Northwest Corner (1 <sup>st</sup> American Title)	100.00	Y
756.000	1.00	Northwest Corner of First & Madison	175.00	Y
756.00	2.00	Washington between Central and First Street (South side)	200.00	Y
756.00	3.00	Central between Adams & Washington	147.00	Y
756.00	4.00	201 North First Street (Bank One Center)	1,957.00	Y
756.00	5.00	Between Adams and 40 North Second Street (Regency Garage)	519.00	Y
756.00	6.00	North side of Washington between Central & First Street	145.00	Y
756.00	7.00	Third Street & Jefferson-Northwest Corner (Civic Plaza Lot)	400.00	Y
759.00	1.00	333 South Third Street (Jefferson Street Garage)	1,450.00	Y
759.00	2.00	Third Street between Washington & Adams (Phoenix Civic Plaza)	700.00	Y
759.00	3.00	Fifth Street between Washington & Adams (Phoenix Civic Plaza Parking)	280.00	Y

**APPENDIX D**  
**SAS ANALYSIS FOR  $F_{ij}$**

General Linear Models Procedure  
Class Level Information

Class	Levels	Values
FACIL	11	1 2 3 4 5 6 7 8 9 10 11
SPACET	5	AF AS RF UN US

Number of observations in data set = 301

**NOTE:** Due to missing values, only 299 observations can be used in this analysis.

## General Linear Models Procedure

Dependent Variable: FIJ

Source	DF	Sum of Squares	Mean Square	F Value	PR>F
Model	26	19.6254497	0.7548250	6.38	0.0001
Error	272	32.1796211	0.1183074		
Corrected Total	298	51.8050708			
	R-Square	C.V.	RootMSE		FIJ MEan
	0.378833	107.1293	0.34396		0.32107

## General Linear Models Procedure

Dependent Variable: FIJ

Source	DF	Type I SS	Mean Square	F Value	Pr >F
FACIL	10	13.8207915	1.3820792	11.68	0.0001
SPACET	4	0.7031028	0.1757757	1.49	0.2067
FACIL*SPACET	12	5.1015553	0.4251296	3.59	0.0001

Source	DF	Type III SS	Mean Square	F Value	Pr>F
FACIL	10	5.68861388	0.56886139	4.81	0.0001
SPACET	4	0.90211789	0.22552947	1.91	0.1096
FACIL*SPACET	12	5.10155531	0.42512961	3.59	0.0001

## General Linear Models Procedure

## Duncan's Multiple Range Test for variable: FIJ

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate.

Alpha=0.05 df=272 MSE=0.118307

WARNING: Cell sizes are not equal.

Harmonic Mean of cell sizes=22.91018

Number of Means	2	3	4	5	6	7	8	9	10	11
Critical Range	.2001	.2106	.2177	.2229	.2269	.2302	.2330	.2353	.2373	.2391

Means with the same letter are not significantly different.



## General Linear Models Procedure

Duncan Grouping		Mean	N	FACIL	
	A	0.6590	40	7	Phelps Dodge-Central
	A				
	A	0.6459	18	9	Renaissance-Downtown
	A				
	A	0.5737	15	2	Auto Ramp-Downtown
	B	0.3556	44	10	AT&T-Central
	B				
	B	0.3454	33	8	Phoenix Plaza-Central
	B				
C	B	0.3157	25	11	3300 North Central-Central
	B				
	B	0.2459	11	4	Crown Central-Central
C	B				
C	B	0.2262	21	3	3030 North Central-Central

General Linear Models Procedure

Duncan Grouping			Mean	N	FACIL	
C	B					
C	B	D	0.1992	25	5	Financial Center-Central
C		D				
C		D	0.0524	39	6	Court I & II - CB
		D				
		D	0.0000	28	1	Uhaul-Central

General Linear Models Procedure

Duncan's Multiple Range Test for variable: FIJ

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate.

Alpha=0.05                  df=272                  MSE=0.118307

WARNING: Cell sizes are not equal.

Harmonic Mean of cell sizes = 7.523055

Number of Means	2	3	4	5
Critical Range	.3492	.3676	.3798	.3889

Means with the same letter are not significantly different.

General Linear Models Procedure

Duncan Grouping		Mean	N	SPACET	
	A	0.3952	154	UN	
	A				
B	A	0.3786	15	RF	
B	A				
B	A	0.2330	123	AS	Use these for FIJ
B	A				
B	A	0.1989	4	US	
B					
B		0.0000	3	AF	

## General Linear Models Procedure

Level of FACIL	Level of SPACET	N	FIJ Mean	SD
1	AF	3	0.00000000	0.00000000
1	AS	25	0.00000000	0.00000000
2	AS	1	0.40000000	
2	RF	1	0.00000000	
2	UN	13	0.63117409	0.48738690
3	AS	7	0.31428571	0.36709931
3	UN	14	0.18214286	0.27830871
4	AS	8	0.16168862	0.30103415
4	UN	3	0.47036689	0.47036689
5	AS	12	0.30294613	0.45672974
5	UN	9	0.06088280	0.18264840
5	US	4	0.19886364	0.39772727
6	AS	6	0.19444444	0.15515822
6	UN	33	0.02651515	0.09247875
7	AS	9	0.20370370	0.40635386

## General Linear Models Procedure

Level of FACIL	Level of SPACET	N	FIJ Mean	SD
7	RF	2	0.00000000	0.00000000
7	UN	29	0.84568966	0.39211360
8	AS	12	0.33333333	0.49236596
8	RF	3	0.51428571	0.50061187
8	UN	18	0.32525253	0.33536571
9	AS	10	0.57857143	0.32550327
9	UN	8	0.72997727	0.46251196
10	AS	13	0.26794872	0.35567239
10	RF	9	0.45959596	0.47042954
10	UN	22	0.36477273	0.34022569
11	AS	20	0.24306452	0.38895743
11	UN	5	0.60638298	0.55354939

## APPENDIX E

PWT ij

Number of Returned Postcards

	AF W	AS V	W	HC V	W	RF W	UN V	W	US V	W	VS V	W
1	2	1	25								1	1
2			1			1	3	13				
3			7				1	14				
4	1		8		1			3		1		
5			12					9	1	4		
6		2	6	1	2			33				3
7			9			2		29			2	1
8			12			3		18			2	3
9			10		1			8			1	2
10			13		2	9	1	22			5	
												Z=21
	100%	3	103				5	149				11-Visitor
	W		97%		86%	100%		97%		83%		0-Worker
												~50%

**PWT<sub>ij</sub>**



## APPENDIX F

### OS

General Linear Models Procedure

Dependent Variable: OCC

Source	DF	Type I SS	Mean Square	F Value	Pr>F
TYPE	5	1.45377373	0.29075475	7.47	0.0001
Source	DF	Type III SS	Mean Square	F Value	Pr>F
TYPE	5	1.45377373	1.45377373	7.47	0.0001

General Linear Models Procedure

Duncan's Multiple Range Test for variable: OCC

NOTE: This test controls the type I comparisonwise error rate, not the experimentwise error rate.

Alpha=0.05 df=32 MSE=0.038916

WARNING: Cell sizes are not equal.

Harmonic Mean of cell sizes=3.998846

Number of Means	2	3	4	5	6
Critical Range	.2842	.2987	.3081	.3149	.3200

Means with the same letter are not significantly different.

General Linear Models Procedure

Duncan Grouping		Mean	N	TYPE	
	A	0.7500	7	VS	
	A				
B	A	0.6300	2	US	
B	A				.6073
B	A	0.6218	11	AS	
B	A				
B	A	0.4870	10	UN	
B					
B	C	0.3700	2	AF	
	C				.1938
	C	0.1350	6	RF	

General Linear Models Procedure  
Class Level Information

Class	Levels	Values
TYPE	6	AF AS RF UN US VS
LOCAT	11	3030 North Central, 3300 North Central, AT &T Bldg., Auto Ramp Court I & II, Crown Central Financial Center, Phelps Dodge Bldg., Phoenix Plaza, Renaissance Square, U-Haul Towers

Number of observations in data set = 38

## General Linear Models Procedure

Dependent Variable: OCC

Source	DF	Sum of Squares	Mean Square	F Value	Pr>F
Model	5	1.45377373	0.29075475	7.47	0.0001
Error	32	1.24532364	0.03891636		
Corrected Total	37	2.69909737			
	R-Square	C.V.	Root MSE		OCC Mean
	0.538615	37.91779	0.19727		0.52026